PB 181053 Price $0.50

MODIFICATION INSTRUCTIONS

HERMACH ENGELHARD - MODEL 30081 TRANSFER VOLT-AMMETER

TDO M-3

1 FEBRUARY 1960

DEPARTMENT OF THE NAVY
BUWEPS-BUSHIPS CALIBRATION PROGRAM

METROLOGY DEPARTMENT
BUREAU OF NAVAL WEAPONS REPRESENTATIVE
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1. SCOPE

1.1 A series of failures have occurred in the operation of the Hermach-Engelhard Model 30081 Transfer Volt-Ammeter. These failures have occurred principally in the thermoelements. In a few cases, the thermoelements have been overloaded to the point of burnout, however this problem is a function of operator error, and the only solution is proper precaution by operating personnel. The principal cause of thermocouple failure to date has not been a result of overloading.

1.2 The physical deficiencies of the subject transfer volt-ammeter have been traced to the lack of proper connection between the heater and thermojunction. An insulated type thermoelement is required in this instrument and, as such, the insulation resistance must remain in excellent condition. There are two principal effects which occur because of improper connection between the heater and thermocouple.

1.2.1 A large voltage drop may exist across the insulating bead in the thermoelement, allowing leakage current to flow, and resulting in appreciable heating of the insulating bead. This additional heat is sensed by the thermojunction and erroneous voltage indications are produced.

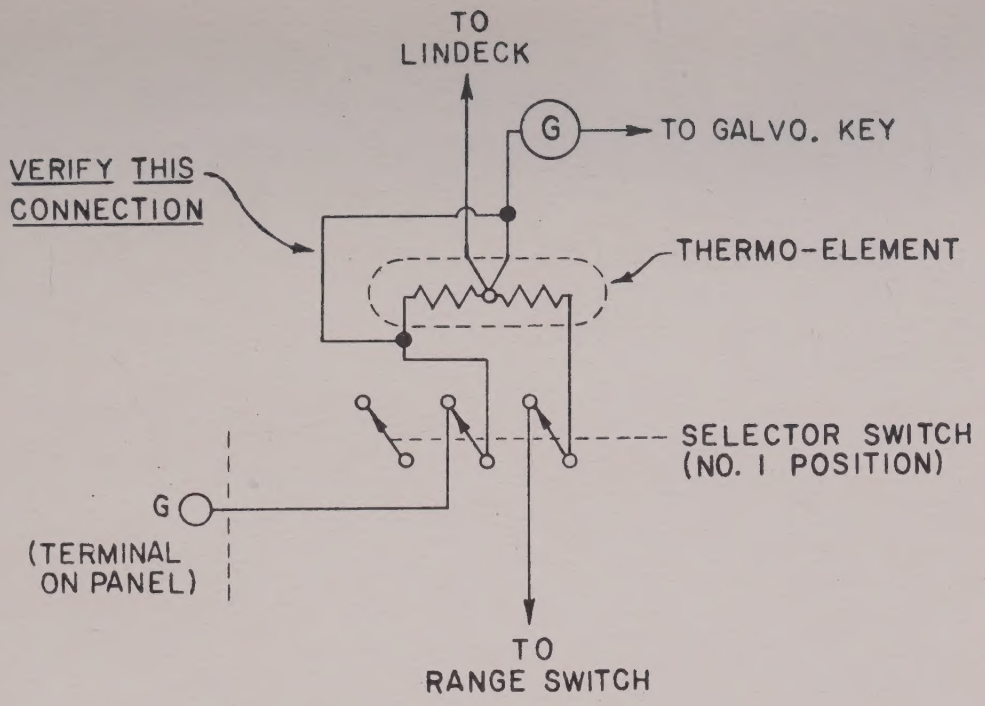
1.2.2 The voltage drop across the insulating bead may be sufficiently high to cause a dielectric breakdown and loss of insulation, resulting in unsymmetrical currents flowing in the thermoelement which will yield false indications.

1.3 It has been determined that the voltage between the heater and the thermojunction should never exceed 10 volts. Because of the capacitive coupling of the Lindeck element back to the source, the thermoelement should not be operated at a level greater than 2 volts above ground. The insulating resistance of the thermoelement insulating bead should be in excess of 20 megohms.

1.4 It should be noted in the modification that the galvanometer side of the thermocouple is connected to the ground side of the heater. This is important as it decreases the capacitive coupling to the Lindeck element, reduces the voltage difference between heater and thermocouple, and virtually eliminates the problem of dielectric failure.

2. GENERAL INSTRUCTION

2.1 The modification is shown on the schematic titled MODIFICATION - HERMACH-ENGELHARD TRANSFER VOLT-AMMETER, drawing No. TDO M-3. It is recommended that the personnel responsible investigate subject transfer volt-ammeter in possession of the standards laboratory, determine if the heater and thermocouple have been properly connected, if not, take corrective action.



ENGINEER	ANDERSON	10-15-59
CHECKER	FOSTER	10-15-59
DRAWN BY	RAMBOZ	10-15-59

MODIFICATION

HERMACH-ENGELHARD

TRANSFER VOLT-AMMETER

SCALE

DEPARTMENT OF NAVY
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TDO M-3

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